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PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Appl. No. : 09/868,289

Applicants: ARNOUX et al.

Filed : July 10, 2001

Title : THERMOSETTING POLY URETHANE/UREA-FORMING  
COMPOSITIONS

TC/A.U. : 1711

Examiner : Sergeant, R. A.

Docket No.: 0244-PC (UNI202US)

**APPELLANTS' SECOND AMENDED BRIEF**

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Sir:

The above-identified Appellants submit this Appellants' Second Amended Brief pursuant to 37 C.F.R. § 41.37(d). The Examiner issued a Notice of Non-Compliant Appeal Brief on October 18, 2006, stating the appeal brief required an accurate Summary of the Claimed Subject Matter. The Appellants amended the brief accordingly.

The fee for the appeal was paid with the original submission. No additional fees are believed to be due. However, if a fee is due, please charge Deposit Account No. 23-2656.

The Appellants rely upon the following authorities and arguments to maintain the appeal.

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**1. Real Party in Interest**

The real party in interest for this matter is the Appellants' assignee. The assignee and real party in interest is Chemtura Corporation, formerly known as Crompton Corporation, Benson Road, Middlebury, Connecticut 06749.

**2. Related Appeals and Interferences**

There are no other appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**3. Status of Claims**

The status of the claims is as follows:

- (1) Claims 1-19, 27, 29, and 42 are canceled; and
- (2) Claims 20-26, 28, 30-41, and 43-50 are rejected and appealed.

The procedural history behind this status of the claims is as follows:

Application No. 09/868,289 was filed on July 10, 2001, as a national phase application of International Application No. PCT/EP99/10040. Claims 1 through 19 were originally filed.

In an Office Action of July 2, 2002, claims 1 through 19 were rejected under 35 U.S.C. § 112, second paragraph;

claims 1 through 3, 7, 10 through 12, and 16 were rejected under 35 U.S.C. § 102(b) as being anticipated by Werner (U.S. Patent No. 3,980,606);

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claims 1 through 4, 7, 10 through 13, and 16 were rejected under 35 U.S.C. § 102(b) as being anticipated by JP 6-16767; and

claims 4 through 9 and 13 through 19 were rejected under 35 U.S.C. § 103(a).

In a Response of January 2, 2003, Appellants canceled claims 1 through 19 and added new claims 20 through 49.

In an Office Action of March 18, 2003, claims 21 and 34 were rejected under 35 U.S.C. § 112, second paragraph, claims 20 through 23, 27, 29, 33 through 36, 39, 41 through 43, 45, and 49 were rejected under 35 U.S.C. § 102(b), and claims 20 through 32, 37, 38, 40, 44, and 46 through 48 were rejected under 35 U.S.C. § 103(a).

In a Response of September 18, 2003, the Appellants amended claims 20, 21, 27, 33, 34, 40, and 42.

In an Office Action of February 17, 2004, the Examiner made final the rejection of claims 20 through 23, 27, 29, 33 through 36, 39, 41 through 43, 45, and 49 under 35 U.S.C. § 102(b) and the rejection of claims 20 through 32, 37, 38, 40, 44, and 46 through 48 under 35 U.S.C. § 103(a).

In an Amendment of July 16, 2004, under 37 C.F.R. § 1.116, the Appellants amended claims 20, 27, 33, and 42.

In an Advisory Action of August 13, 2004, the Examiner stated that the Appellants' request for reconsideration had been considered but did not place the application in condition for allowance. The Examiner did not enter the Appellants' proposed amendments.

On August 17, 2004, the Appellants filed a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114.

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In an Office Action of September 17, 2004, the Examiner entered the Appellants' submission of July 16, 2004, rejected claims 33 through 49 under 35 U.S.C. § 112, first and second paragraphs, rejected claims 20 through 23, 27, 29, 33 through 36, 39, 41 through 43, 45, and 49 under 35 U.S.C. § 102(b), or in the alternative, under 35 U.S.C. § 103(a), and rejected claims 20 through 32, 37, 38, 40, 44, and 46 through 48 under 35 U.S.C. § 103(a).

In a Response of January 14, 2005, the Appellants canceled claims 27, 29, and 42, amended claims 20 and 33, and added new claim 50.

In a Notice of Non-Compliance of April 20, 2005, the Examiner found the amendment to claim 33 to be non-compliant with 37 C.F.R. § 1.121, because the Appellants failed to underline a change in punctuation. The Examiner also thought a typographical error in claim 40 was an improper amendment.

In a Second Amendment of May 5, 2005, the Appellants amended claim 33 to denote the change in punctuation, corrected the typographical error in claim 40, and further argued the rejections set forth in the Office Action of September 17, 2004.

In a Notice of Non-Compliance of July 27, 2005, the Examiner found the amendments to claims 33 and 40 to be non-compliant with 37 C.F.R. § 1.121, because the Appellants used a single bracket to denote deleted matter rather than a double bracket.

In a Response of August 12, 2005, the Appellants amended claims 33 and 40 to replace the single brackets with double brackets.

In an Office Action of November 2, 2005, the Examiner made final the rejection of claims 33 through 41 and 43 through 50 under 35 U.S.C. § 112, first paragraph, the rejection of claim 49 under 35 U.S.C. § 102(b), the rejection of claims 33 through 36, 39, 41, 43, and

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45 under 35 U.S.C. § 103(a), and the rejection of claims 20 through 26, 28, 30 through 32, 37, 38, 40, 44, 46 through 48, and 50 under 35 U.S.C. § 103(a).

In an Amendment of December 19, 2005, under 37 C.F.R. § 1.116, the Appellants canceled claims 33, 39, 41, 43, 45, and 49, and amended claims 34-38, 40, 44, and 46-48.

In an Advisory Action of January 4, 2006, the Examiner stated that the Appellants' request for reconsideration had been considered, but did not place the application in condition for allowance. The Examiner did not enter the Appellants' proposed amendments.

Appellants filed a Notice of Appeal on January 31, 2006.

**4. Status of Amendments**

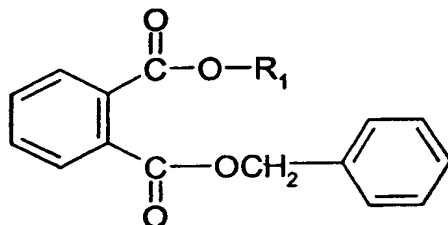
The proposed amendments filed on December 19, 2005, were not entered by the Examiner. Therefore, the attached listing of claims reflects the claims as amended at the time of the final Office Action of November 2, 2005.

**5. Summary of Claimed Subject Matter**

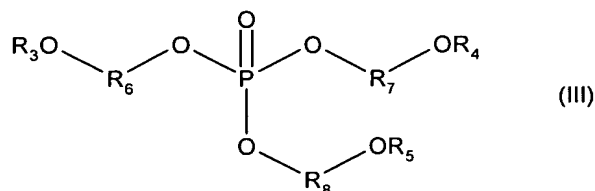
The present invention, as described in the specification at page 3, line 8, through page 4, line 13, is drawn to a poly urethane/urea-forming casting composition that can be cast and cured at temperatures between 15° and 35°C using a reaction mixture comprised of (a) an isocyanate component or an isocyanate functional prepolymer having at least two isocyanate groups per molecule that contains or has been reacted with polytetramethylene I glycol, (b) an aromatic amine curative, and (c) a phosphate ester or phthalate ester having a vapor pressure

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of less than 100 mPa at 25°C. The phthalate ester is a monomer according to the following formula (IA):



in which R<sub>1</sub> is unsubstituted or alkyl-substituted C<sub>3</sub>-C<sub>12</sub> alkyl. The phosphate ester is isodecyl diphenyl phosphate or a monomer according to the following formula (III):



in which R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, are independent of one another, and are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkyl, and R<sub>6</sub>, R<sub>7</sub>, and R<sub>8</sub>, are independent of one another, and are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkylene. (*See* specification page 3, line 8, through page 4, line 13, and claim 20.)

In a second embodiment, as described in the specification at page 5, line 1, through page 6, line 11, the present invention is drawn to a process for preparing a polyurethane casting at ambient conditions. The process comprises contacting (a) an isocyanate component or an isocyanate functional prepolymer having at least two isocyanate groups per molecule

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that contains or has been reacted with polytetramethylene glycol, with (b) an aromatic amine curative agent having at least two primary amine groups, and (c) a phosphate ester or phthalate ester having a vapor pressure of less than 100 mPa at 25°C. The phthalate ester is a monomer according to formula IA above in which R<sub>1</sub> is unsubstituted or alkyl-substituted C<sub>3</sub>-C<sub>12</sub> alkyl, and the phosphate ester is isodecyl diphenyl phosphate or a monomer according to formula III above in which R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, independently of one another, are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkyl, and R<sub>6</sub>, R<sub>7</sub>, and R<sub>8</sub>, independently of one another are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkylene. The resulting combination of components (a), (b), and (c) is combined and then poured into a mold and cured. (*See* specification page 5, line 1, through page 6, line 11, and claim 50.)

In a final embodiment, as described in the specification at page 6, lines 13-17, and page 10, lines 1-5, the present invention is drawn to a process for preparing polyurethane casting at ambient conditions. The process to produce the castable composition comprises contacting (a) an isocyanate component or an isocyanate functional prepolymer having at least two isocyanate groups per molecule that contains or has been reacted with polytetramethylene glycol, with (b) an aromatic amine curative agent having at least two primary amine groups, and (c) a plasticizing agent having a vapor pressure of less than 100 mPa at 25°C and/or an evaporation rate less than 40 percent after 24 hours at 87°C according to ASTM 1203-67. (*See* specification page 6, lines 13-17 and page 10, lines 1-5, and claim 33.)

**6. Grounds of Rejection to Be Reviewed on Appeal**

(A) Are claims 33 through 41 and 43 through 50 unpatentable under 35 U.S.C § 112, first paragraph, because they contain subject matter that is not supported by the written description?

(B) Is claim 49 unpatentable under 35 U.S.C § 102(b) as anticipated by or, in the alternative, under 35 U.S.C § 103(a) as obvious over JP 6-16767?

(C) Are claims 33 through 36, 39, 41, 43, and 45 unpatentable under 35 U.S.C. § 103(a) as being obvious over JP 6-16767?

(D) Are claims 20 through 26, 28, 30 through 32, 37, 38, 40, 44, 46 through 48, and 50 unpatentable under 35 U.S.C. § 103(a) as being obvious over JP 6-16767, in view of Singh *et al.* (U.S. Patent No. 5,077,371) and further in view of Rizk *et al.* (U.S. Patent No. 5,817,860), Peter (U.S. Patent No. 5,990,258), and Gabbard *et al.* (U.S. Patent No. 5,232,956)?

**7. Argument**

**The Background of the Invention**

The claimed invention relates to casting polyurethane and/or poly urethane/urea-forming products capable of curing at ambient conditions. More particularly, the invention is drawn to liquid compositions containing isocyanate-functional prepolymers, an aromatic amine curative thereof, and a non-volatile phosphate or phthalate plasticizer. The selected poly urethane/urea-forming compositions produce, after ambient-temperature cure, non-



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sweating, non-distorting castings or boards with superior elasticity, toughness, tear strength and abrasion resistance. (*See* specification page 1, lines 4-10.)

Aromatic polyisocyanates are well known and are widely used in the preparation of polyurethane and poly urethane/urea elastomers. These aromatic diisocyanates generally include compositions such as 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, 4,4'-methylene bis (phenylisocyanate) and the like. However, a major problem with mononuclear aromatic diisocyanates, such as toluene diisocyanate, relates to their perceived health risks and their volatility. (*See* specification page 1, lines 14-30.)

The Appellants explained in their application that the efforts disclosed in the prior art to reduce mononuclear aromatic diisocyanates, such as toluene diisocyanate, have a variety of detrimental effects on the casting process. For example, it is known that residual toluene diisocyanate (free toluene diisocyanate) in a prepolymer mixture can be reduced by lowering the isocyanate/hydroxyl ratio of the prepolymer mixture. This modification, however, has a detrimental effect on processing when the prepolymer is chain extended (or cured), namely, the hardness build up rate decreases very significantly, which leads to an extended demolding time. The prepolymer viscosity also builds up to levels which prevent processability at ambient temperatures. (*See* specification page 1, line 30, to page 2, line 4.)

As described in Rizk *et al.*, U.S. Patent No. 5,817,860, it is known that plasticizers are commonly used for polyurethane foaming compositions to modify the foam properties or to ease processing. However, many conventional plasticizers are either too volatile, which leads to dimensional instability, become physically incompatible after cure, or have insufficient viscosity reducing effect. (*See* specification page 2, lines 18-19, and page 3, lines 1-3). It is

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also known that by incorporating 2,4 toluene diisocyanate dimer into a prepolymer mix, a low NCO/OH ratio can be used to obtain the desired low residual free toluene diisocyanate content while maintaining the desired hardness build up rate. Such a composition is described by Singh *et al.* (U.S. Patent No. 5,077,371). However, the prepolymer's viscosity is measured at 100°C and cured at temperatures in excess of 100°C using 4,4'-methylene-bis(3-chloro)aniline. (*See* specification page 2, lines 8-16.)

No phosphate ester plasticizers or room temperature curing are described or contemplated by the teachings of the '371 Patent. There is a need for a poly urethane/urea forming composition having a low free toluene diisocyanate content that is capable of being cast and cured at room temperatures. Through much effort and research, the Appellants have overcome these obstacles through the selection of a specific combination of ingredients, and in particular, the selection of a particular class of plasticizers. The result is a poly urethane/urea-forming product having a low free toluene diisocyanate content that is moldable and curable under ambient conditions.

**The Pending Rejections**

- (A) Are claims 33-41 and 43-50 unpatentable under 35 U.S.C § 112, first paragraph, because they contain subject matter that is not supported by the written description?**

Claims 33-41 and 43-50 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. According to the Examiner: "The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention."

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The first sentence of Example 1 states, "The following components are combined in a closed vessel at ambient pressure and temperature." The first sentence of Example 2 states, "The components identified below are combined analogously to the methods described in example 1 to produce an homogenous mixture." The third sentence of Example 3 states, "The mixtures are allowed to cure at ambient conditions for 16 hours."

Thus, all of the examples are directed to curing at "ambient conditions." Those of ordinary skill in the art, upon reading these examples in combination with the disclosure of the specification that reads, "The present invention is drawn to a still further embodiment of a process for curing a poly urethane/urea-forming composition comprising contacting said poly urethane/urea-forming composition at a temperature between 15° and 35°C with (a) an aromatic amine curative having at least two primary amine groups, and (b) a plasticizer having a vapor pressure of less than 100 mPa at 25°C with said poly urethane/urea-forming composition," would be fully aware that the ambient conditions of the examples were preferred conditions within the disclosed 15° to 35°C temperature range.

Further, ADIPRENE LF750D has been identified in the specification in the eighth paragraph under DETAILED DESCRIPTION OF THE INVENTION as a commercially available prepolymer of toluene diisocyanate and a polyol or polyol blend. Additionally, BYK A530 is identified in Example 1 as a degassing aid. Persons skilled in the art would have no difficulty obtaining or learning more about these market-available products.

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**(B) Is claim 49 unpatentable under 35 U.S.C § 102(b) as anticipated by or, in the alternative, under 35 U.S.C § 103(a) as obvious over JP 6-16767?**

Claim 49 has been rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 6-16767.

The Appellants canceled claim 49 in their Amendment of December 19, 2005, under 37 C.F.R. § 1.116. However, the Examiner improperly refused to enter this amendment. Appellants have concurrently filed a petition with the Commissioner, pursuant to 37 C.F.R. § 1.181, seeking to have the proposed amendments of December 19, 2005, entered.

As stated in Section 714.12 of the MPEP, "Except where an amendment merely cancels claims, adopts examiner suggestions, removes issues for appeal, or in some other way requires only a cursory review by the examiner, compliance with the requirement of a showing under 37 § C.F.R. 1.116(b)(3) is expected in all amendments after final rejection."

In this instance, the Appellants were merely canceling a claim. Further, the amendment was made to overcome a new ground of rejection for claim 49 that was first presented in the final Office Action of November 2, 2005. In paragraph 6 of the Office Action of September 17, 2004, the Examiner stated the following:

The examiner has considered applicants' argument that octyldiphenyl phosphate of the reference fails to encompass ethylhexyldiphenyl phosphate. In response to the applicants' argument, the position is taken that applicants have set forth no definitive evidence that the claimed compound is not encompassed by the prior art . . . . It is noted that this issue is *not* relevant to claims 33-36, 39, 41, 43, and 49. (Emphasis added.)

Then in paragraphs 4 and 5 of the Office Action of November 2, 2005, the Examiner rejects claim 49 on the same grounds as above after he specifically noted that these grounds did not apply to claim 49.

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The response with regard to claim 49 should have been entered because it merely canceled the claim. Further, as shown above, the amendment meets the requirements of 37 C.F.R. § 1.116(b)(3), because the Appellants were responding to a new ground of rejection and thus could not have presented it earlier. Finally, the amendment would have placed the application in a better condition for appeal by eliminating the need to appeal the rejection of claim 49 under 35 U.S.C § 102(b) as anticipated by or, in the alternative, under 35 U.S.C § 103(a) as obvious over JP 6-16767.

**(C) Are claims 33 through 36, 39, 41, 43, and 45 unpatentable under 35 U.S.C. § 103(a) as being obvious over JP 6-16767?**

Claims 33-36, 39, 41, 43, and 45 have been rejected under 35 U.S.C. 103(a) as being obvious over JP 6-16767.

In the Amendment of December 19, 2005, under 37 C.F.R. § 1.116, the Appellants canceled claims 33, 39, 41, 43, and 45, and amended claims 34-36 to be dependent upon claim 50, to which this rejection has not been applied. The Examiner improperly refused to enter these amendments. Appellants have concurrently filed a petition with the Commissioner, pursuant to 37 C.F.R. § 1.181, seeking to have the proposed amendments of December 19, 2005, entered.

In the Advisory Action of January 4, 2006, the Examiner stated:

The proposed amendment sets forth a combination of limitations not previously claimed. For example, the subject matter of claims 34-36 has not been previously claimed in combination with component (c) as claimed within claim 50. Therefore, the proposed amendment raises new issues that would require further consideration and/or search.

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The proposed amendment does not raise new issues. Claims 34-36 are currently dependent on claim 33. Claim 33 is directed towards a process for preparing polyurethane casting and includes a component (c) that is "a plasticizing agent having a vapor pressure of less than 100 mPa at 25°C and/or an evaporation rate of less than 40% after 24 hours at 87°C according to ASTM 1203-67." Claim 50 is directed towards the same process and claims and includes a component (c) that is "a phosphate ester or phthalate ester having a vapor pressure of less than 100 mPa at 25°C," with specific formulas claimed for both the phosphate and phthalate esters. As described on page 10 of the specification, the scope of plasticizing agents, as claimed in the present invention, clearly includes phosphate and phthalate esters. Thus, the scope of claim 50 is significantly narrower than the scope of claim 33. Any search done for claims 34-36 as dependent on claim 33 would also include references encompassing claims 34-36 as dependent on claim 50.

**(D) Are claims 20-26, 28, 30-32, 37, 38, 40, 44, 46-48, and 50 unpatentable under 35 U.S.C. § 103(a) as being obvious over JP 6-16767, in view of Singh et al., and further in view of Rizk et al., Peter, and Gabbard et al.?**

Claims 20-26, 28, 30-32, 37, 38, 40, 44, 46-48, and 50 have been rejected under 35 U.S.C. 103(a) as being unpatentable over JP 6-16717 in view of Singh et al. (U.S. Patent No. 5,077,371) and further in view of Rizk et al. (U.S. Patent No. 5,817,860), Peter (U.S. Patent No. 5,990,258), and Gabbard et al. (U.S. Patent No. 5,232,956).

**JP 6-16717** discloses a reaction injection molding type polyurethane based elastomer forming composition, comprising a liquid A comprising 100 parts by weight of a urethane

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prepolymer (1) derived from a tolylenediisocyanate (a) and a polyoxytetramethyleneglycol (b) containing 2.0 to 8.0 wt.% of isocyanate group having isocyanate group on the terminal, and a liquid B comprising 5 to 20 parts by weight of an aromatic diamine chain extender (2) having a molecular weight of 110 to 500, 5 to 115 parts by weight of a plasticizer (3) and 0.05 to 5 parts by weight of a catalyst (4) which accelerates chain extension, wherein the viscosity of the liquids A and B at 80°C is no more than 1500cP (centipoise).

The reference teaches that plasticizers conventionally used in polyurethane chemistry are, for example, phthalates, aliphatic dibasic acid esters, glycol esters, fatty acid esters, phosphates, and mixtures of two or more thereof. Specific mention is made of dimethylphthalate, diethylphthalate, diisobutylphthalate, dibutyl phthalate, diheptylphthalate, di-2-ethylhexylphthalate, diisooctylphthalate, di-n-octylphthalate, dinonylphthalate, diisodecylphthalate, ditridecylphthalate, dicyclohexylphthalate, diisodecyl succinate, dioctyl adipate, diisodecyl adipate, dioctyl azelate, dibutyl sebacate, dioctyl sebacate, dioctyl tetrahydrophthalate, diethylene glycol dibenzoate, dipentaerythritolhexaester, pentaerythritol ester, butyl oleate, methyl acetyl ricinoleate, chlorinated fatty acid methyl, methoxychlorinated fatty acid methyl, tricresyl phosphate, trioctyl phosphate, octyldiphenyl phosphate, triphenyl phosphate, trichloroethyl phosphate, and cresyldiphenyl phosphate. Of these, preferred are phthalates and aliphatic dibasic acid esters, and particularly preferred are esters substituted by an alkyl group having no more than eight carbon atoms.

Not one of the plasticizers in JP 6-16767 reads on the plasticizers of the present claims. It is submitted that none of the secondary references, either alone or in combination,

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supplements the deficiencies of the primary reference discussed above to render the present invention unpatentable.

**Singh et al.** disclose a low-free toluene diisocyanate prepolymer formed by reaction of a blend of the dimer of 2,4-toluene diisocyanate and an organic diisocyanate, preferably isomers of toluene diisocyanate, with high molecular weight polyols and optional low molecular weight polyols. The prepolymer can be further reacted with conventional organic diamines or organic polyol curatives to form elastomeric polyurethane/ureas or polyurethanes.

**Rizk et al.** disclose a polyisocyanate prepolymer composition comprised of the reaction product of (a) a polyisocyanate having an average functionality of at least 2 and containing at least about 20 percent by weight of a diisocyanate monomer, (b) a monohydric alcohol and (c) a polyol having an average hydroxyl functionality of at least about 1.8 to at most about 3.2 wherein the prepolymer composition has (i) an amount of isocyanate groups by weight sufficient to react with water in the absence of a supplemental blowing agent to make a foam, (ii) at most about 10.0 percent by weight of the diisocyanate monomer and (iii) an amount of the polyisocyanate that is capped by the monohydric alcohol sufficient to prevent gelling of the prepolymer composition. The prepolymer composition may be reacted with water to form a polyurethane foam.

**Peter** discloses a polyurethane elastomer possessing high resilience and high clarity obtained by subjecting to polyurethane elastomer-forming conditions a polyurethane elastomer-forming reaction mixture comprising (a) an isocyanate selected from the group consisting of diphenyl methane diisocyanate, isocyanate obtained from the reaction of polyol



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with MDI and mixtures thereof; (b) at least one polyol; and (c) at least one diol chain extender of the general formula  $\text{HO}-(\text{CH}_2)_x-\text{OH}$  wherein x is an integer from 5 to about 16.

**Gabbard et al.** disclose a flexible plasticized polyurethane foam in which water is used as the foaming agent and a plasticizer selected from phthalate, phosphate ester and benzoate plasticizers is added to improve the softness and flexibility of the polyurethane.

The Examiner acknowledged that the primary reference is silent with respect to dimethylthiotoluene diamine curing agent and specifically claimed plasticizers, such as isodecyl diphenyl phosphate, butyl benzyl phthalate, and tributoxyethyl phosphate but has taken the position that it would be obvious to incorporate the curing agent and plasticizers of the secondary references within the compositions of the primary reference because it has been held that it is *prima facie* obvious to utilize a known component for its known function.

Here, the Examiner has employed impermissible hindsight. Appellants' invention provides compositions that are moldable and curable *under ambient conditions* by the nonobvious selection of a specific combination of ingredients, and in particular, the selection of a particular class of plasticizers. The disclosures in JP 6-16767 and the secondary references are very general, and the function of the plasticizers in these references appears to be entirely conventional. No specific properties are sought from the plasticizers used in these references, nor is there any indication that any particular plasticizer or group of plasticizers would have any particularly useful properties (such as minimizing distortion). Moreover, there is nothing in either the primary or secondary references to suggest a combination of components that would result in a composition capable of being cast and cured under ambient conditions. Any of a vast range of curing agents and plasticizers available in the prior art

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*could be* incorporated into the composition of JP 6-16767, but there is no indication anywhere in the prior art as to *which* curing agents and plasticizers, or indeed whether *any* particular combination of curing agent and plasticizer would result in the highly desirable properties of castability and curability under ambient conditions, as well as distortion control.

In particular, with regard to the isodecyl diphenyl phosphate of the present claims, it is the Appellants' position that plasticizers containing branched chain groups confer unexpected and superior properties to the compositions of the invention compared to plasticizers containing straight chain alkyl groups. This selection is intimately connected with the claim limitation that the plasticizer must have a vapor pressure of less than 100 mPa at 25°C. Compounds containing long-chain branched alkyl groups have a vapor pressure lower than compounds containing corresponding straight-chain alkyl groups. The cited art does not disclose or suggest the importance of vapor pressure in the selection of a phosphate plasticizer, nor the value of selecting phosphates containing branched-chain alkyl groups rather than straight-chain alkyl groups. Further, and more particularly, the reference makes no mention of the use of *isodecyl*diphenyl phosphate of the claims and, in fact, leads away from its use by the teaching on page 5 that particularly preferred are esters substituted by an alkyl group *having no more than eight carbon atoms*.

**Conclusion**

The Appellants maintain that the Examiner improperly refused to enter the proposed amendments entered under 37 § C.F.R. 1.116. This file should be remanded to the Examiner for entry of the proposed amendments and further prosecution or the rejections should be reversed, and favorable consideration of the application is respectfully requested.

**8. Claims Appendix**

An appendix is attached that contains a copy of the claims, as amended, that are involved in this appeal.

**9. Evidence Appendix**

The Appellants do not rely on additional evidence in this appeal.

**10. Related Proceedings Appendix**

The Appellants are unaware of any related proceedings.

Respectfully submitted,



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2 Nov 2006  
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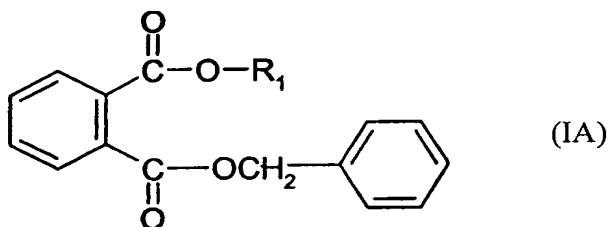
**Claims Appendix**

Listing of Claims:

20. A poly urethane/urea-forming casting composition, which is capable of being cast and cured at temperatures between 15 and 35°C, comprising:

- (a) an isocyanate component or an isocyanate functional prepolymer having at least two isocyanate groups per molecule that contains or has been reacted with polytetramethylene glycol;
- (b) an aromatic amine curative; and
- (c) a phosphate ester or phthalate ester having a vapor pressure of less than 100 mPa at 25°C;

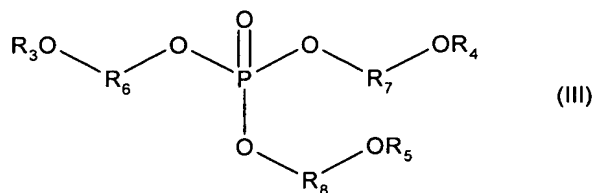
wherein said phthalate ester is a monomer according to formula IA



in which R<sub>1</sub> is unsubstituted or alkyl-substituted C<sub>3</sub>-C<sub>12</sub> alkyl; and

wherein said phosphate ester is isodecyl diphenyl phosphate; or

wherein said phosphate ester is a monomer according to formula III



in which  $R_3$ ,  $R_4$ , and  $R_5$ , independently from one another, are unsubstituted or alkyl substituted  $C_1$ - $C_5$  alkyl, and  $R_6$ ,  $R_7$ , and  $R_8$ , independently from one another, are unsubstituted or alkyl substituted  $C_1$ - $C_5$  alkylene.

21. A casting composition according to claim 20 wherein component (a) is a low free toluene diisocyanate prepolymer blend having a free toluene diisocyanate content below 0.4% by weight of said prepolymer blend.

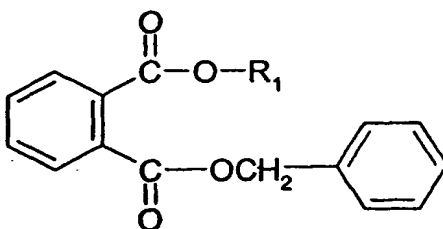
22. A casting composition according to claim 20 wherein component (a) is a prepolymer blend that is a reaction mixture of an organic diisocyanate and polytetramethylene glycol.

23. A casting composition according to claim 20 wherein the aromatic amine curative is selected from the group consisting of diethyl toluene diamine, tertiary butyl toluene diamine, dimethylthiotoluene diamine, and 1,2-bis(2-aminophenylthio)ethane.

24. A casting composition according to claim 23 wherein the aromatic amine curative is dimethylthiotoluene diamine.

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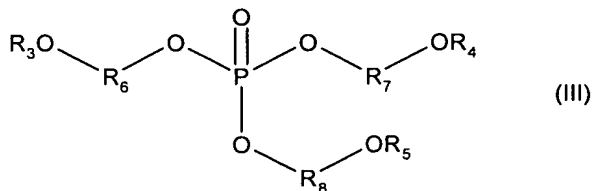
25. A casting composition according to claim 20 further comprising a polyether- and/or polyester polyol having a number average molecular weight of at least 250.
26. A casting composition according to claim 20 wherein component (c) is a phthalate ester according to formula IA



(IA)

in which R<sub>1</sub> is unsubstituted or alkyl-substituted C<sub>3</sub>-C<sub>12</sub> alkyl.

28. A casting composition according to claim 20 wherein component (c) is a phosphate ester according to formula III



(III)

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in which R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, independently from one another, are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkyl, and R<sub>6</sub>, R<sub>7</sub>, and R<sub>8</sub>, independently from one another, are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkylene.

30. A casting composition according to claim 20 wherein component (c) is butyl benzyl phthalate.

31. A casting composition according to claim 20 wherein component (c) is isodecyl diphenyl phosphate.

32. A casting composition according to claim 20 wherein component (c) is tributoxyethyl phosphate.

33. A process for preparing a polyurethane casting, comprising the following steps:  
contacting:

(a) an isocyanate component or an isocyanate functional prepolymer having at least two isocyanate groups per molecule that contains or has been reacted with polytetramethylene glycol, with

(b) an aromatic amine curative having at least two primary amine groups, and

(c) a plasticizing agent having a vapor pressure of less than 100 mPa at 25°C and/or an evaporation rate of less than 40% after 24 hours at 87°C according to ASTM 1203-67;

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pouring the combination of (a), (b) and (c) into a mold; and

curing;

wherein the foregoing steps are all carried out at ambient conditions.

34. The process of claim 33 wherein component (a) is a low free toluene diisocyanate prepolymer blend having a free toluene diisocyanate content below 0.4% by weight of said prepolymer blend.

35. The process of claim 33 wherein component (a) is a prepolymer blend that is a reaction mixture of an organic diisocyanate and polytetramethylene glycol.

36. The process of claim 33 wherein the aromatic amine curative is selected from the group consisting of diethyl toluene diamine, tertiary butyl toluene diamine, dimethylthiotoluene diamine, and 1,2-bis(2-aminophenylthio)ethane.

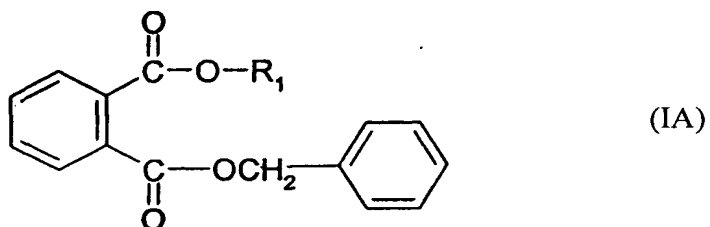
37. The process of claim 33 wherein the aromatic amine curative is dimethylthiotoluene diamine.

38. The process of claim 33 further comprising the step of adding to the combination of (a), (b) and (c) a polyether and/or polyester polyol having a number average molecular weight of at least 250.



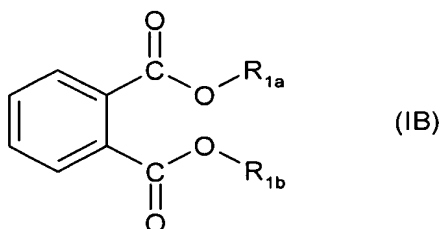
39. The process of claim 33 wherein component (c) is a phosphate ester or phthalate ester having a vapor pressure of less than 100 mPa at 25°C.

40. The process of claim 39 wherein component (c) is a phthalate ester represented by formula IA



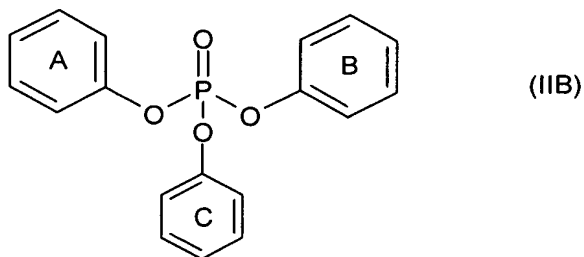
wherein  $R_1$  is unsubstituted or alkyl-substituted  $C_3$ - $C_{12}$  alkyl.

41. The process of claim 39 wherein component (c) is a phthalate ester represented by formula IB



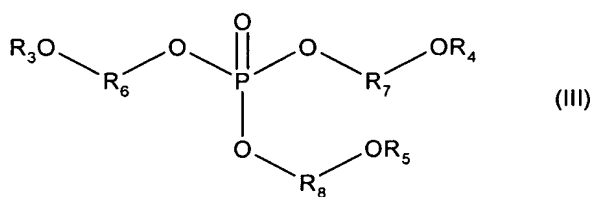
wherein  $R_{1a}$  and  $R_{1b}$ , independently of one another are unsubstituted or alkyl-substituted  $C_5$ - $C_{12}$  alkyl.

43. The process of claim 39 wherein component (c) is a phosphate ester represented by formula IIB



wherein aromatic rings A, B and C, independently of one another, are unsubstituted, or substituted by one or more alkyl substitutions.

44. The process of claim 39 wherein component (c) is a phosphate ester represented by formula III



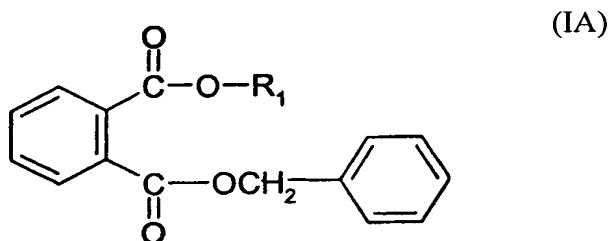
wherein R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, independently from one another, are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkyl, and R<sub>6</sub>, R<sub>7</sub>, and R<sub>8</sub>, independently from one another, are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkylene.

45. The process of claim 39 wherein component (c) is ethylhexyl diphenyl phosphate.

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46. The process of claim 39 wherein component (c) is butyl benzyl phthalate.
47. The process of claim 39 wherein component (c) is isodecyl diphenyl phosphate.
48. The process of claim 39 wherein component (c) is tributoxyethyl phosphate.
49. A cast polyurethane article obtained by a process according to claim 33.
50. A process for preparing a polyurethane casting, comprising the following steps:  
contacting:
- (a) an isocyanate component or an isocyanate functional prepolymer having at least two isocyanate groups per molecule that contains or has been reacted with polytetramethylene glycol, with
  - (b) an aromatic amine curative having at least two primary amine groups, and
  - (c) a phosphate ester or phthalate ester having a vapor pressure of less than 100 mPa at 25°C;

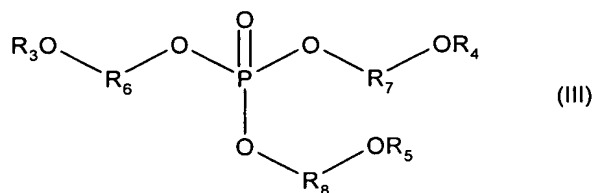
wherein said phthalate ester is a monomer according to formula IA



in which R<sub>1</sub> is unsubstituted or alkyl-substituted C<sub>3</sub>-C<sub>12</sub> alkyl; and

wherein said phosphate ester is isodecyl diphenyl phosphate; or

wherein said phosphate ester is a monomer according to formula III



in which R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, independently from one another, are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkyl, and R<sub>6</sub>, R<sub>7</sub>, and R<sub>8</sub>, independently from one another, are unsubstituted or alkyl substituted C<sub>1</sub>-C<sub>5</sub> alkylene;

pouring the combination of (a), (b) and (c) into a mold; and

curing;

wherein the foregoing steps are all carried out at ambient conditions.

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**Evidence Appendix**

The Appellants do not submit any further evidence pursuant to 37 C.F.R. §§ 1.130, 1.31, or 1.132.

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**Related Proceedings Appendix**

No decisions rendered by a court or the Board in any proceeding identified pursuant to 37 C.F.R. § 41.38(c)(1)(ii) are known to the Appellants.